

Coffee acutely modifies gastrointestinal hormone secretion and glucose tolerance in humans: glycemic effects of chlorogenic acid and caffeine.

Kelly L Johnston, Michael N Clifford and Linda M Morgan

ABSTRACT:

Background: Accumulating evidence suggests that certain dietary polyphenols have biological effects in the small intestine that alter the pattern of glucose uptake. Their effects, however, on glucose tolerance in humans are unknown.

Objective: The objective was to investigate whether chlorogenic acids in coffee modulate glucose uptake and gastrointestinal hormone and insulin secretion in humans.

Design: In a 3-way, randomized, crossover study, 9 healthy fasted volunteers consumed 25 g glucose in either 400 mL water (control) or 400 mL caffeinated or decaffeinated coffee (equivalent to 2,5 mmol chlorogenic acid/L). Blood samples were taken frequently over the following 3 h.

Results: Glucose and insulin concentrations tended to be higher in the first 30 min after caffeinated coffee consumption than after consumption of decaffeinated coffee or the control ($P < 0.05$ for total and incremental area under the curve for glucose and insulin). Glucose-dependent insulinotropic polypeptide secretion decreased throughout the experimental period ($P < 0.005$), and glucagon-like peptide 1 secretion increased 0-120 min postprandially ($P < 0.01$) after decaffeinated coffee consumption compared with the control. Glucose and insulin profiles were consistent with the known metabolic effects of caffeine. However, the gastrointestinal hormone profiles were consistent with delayed intestinal glucose absorption.

Conclusions: Differences in plasma glucose, insulin, and gastrointestinal hormone profiles further confirm the potent biological action of caffeine and suggest that chlorogenic acid might have an antagonistic effect on glucose transport. Therefore, a novel function of some dietary phenols in humans may be to attenuate intestinal glucose absorption rates and shift the site of glucose absorption to more distal parts of the intestine.

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